

b-jet and B hadron correlation initial look

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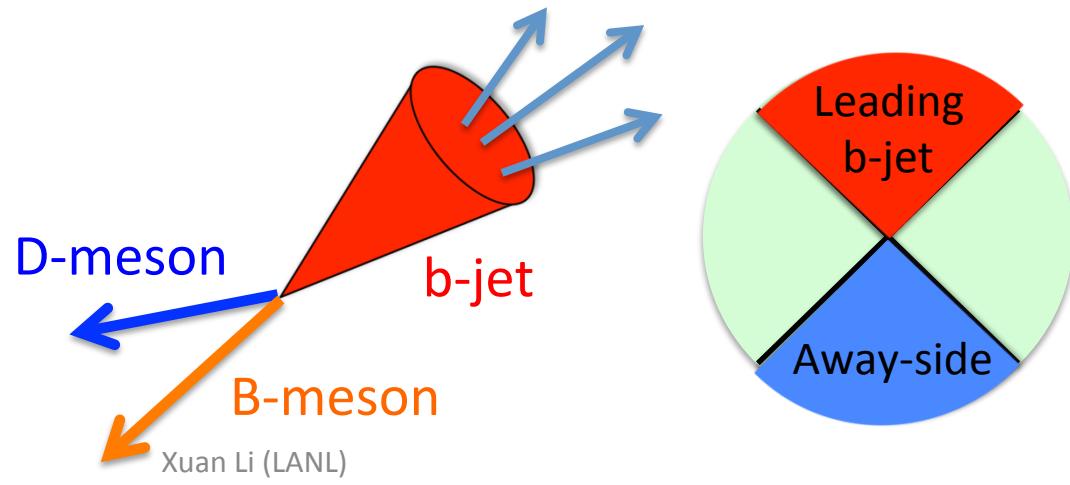
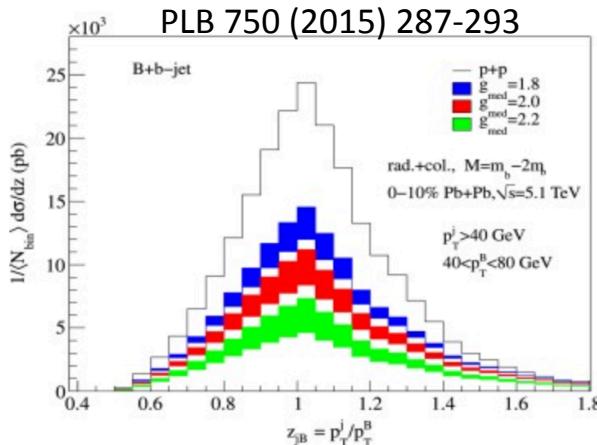
Thank Jin and Haiwang for help.

Motivation

- Through the b-jet and B hadron correlations with B hadron within the leading b-jet jet cone and B hadron within the away-side b-jet jet cone,
 - understand the $b \rightarrow B$ hadron fragmentation process when comparing to di b-jet correlations.
 - provide better constraints on the $b\bar{b}$ sub processes and final state partons.
 - help understand the b quark energy loss in Au+Au collisions.
- The D meson reconstruction studies allows the search of prompt D meson tagging jets, which will provide the information about c-jets and help understand the mass/flavor dependent parton energy loss.

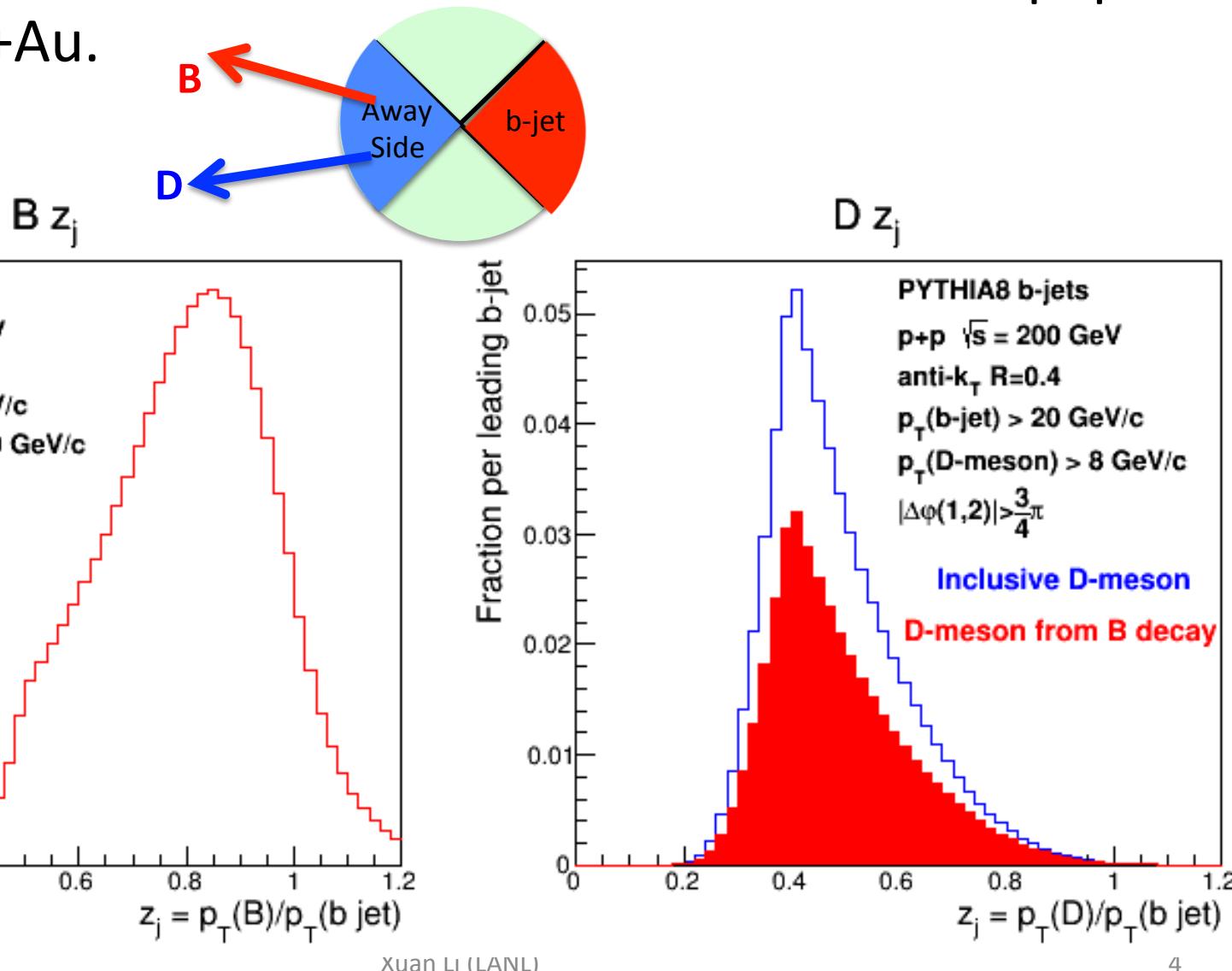
PYTHIA8 simulation

- Run 40M PYTHIA8 Hard b-bbar simulation events.
- Only look at events contain b flavor tagged b-jets with $p_T > 20\text{GeV}/c$ and within $|\eta| < 0.6$.
- Check the away-side B-meson and D-meson z_j .
- Look at all away-side kaons and pions with $p_T > 0.5\text{GeV}/c$ and displaced vertex.
- For kaons and pions, form pairs between them only when the differences between their z decay vertex is less than 1 cm.



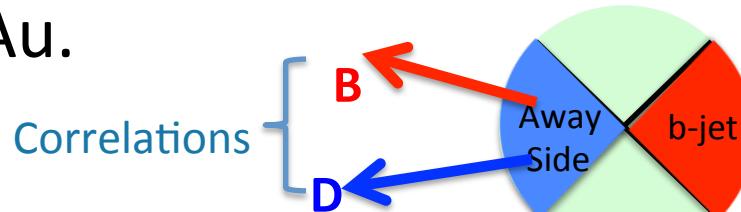
Away-side B-meson and D-meson z_j

- Will check the distributions in full simulation in p+p and Au+Au.

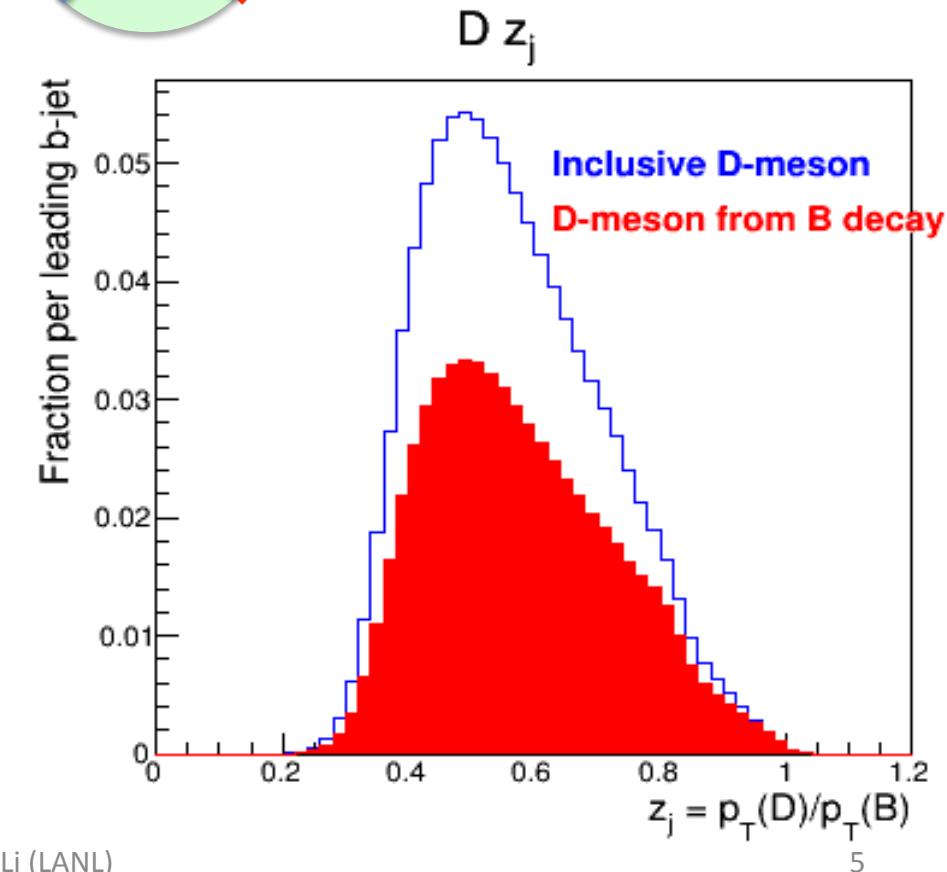
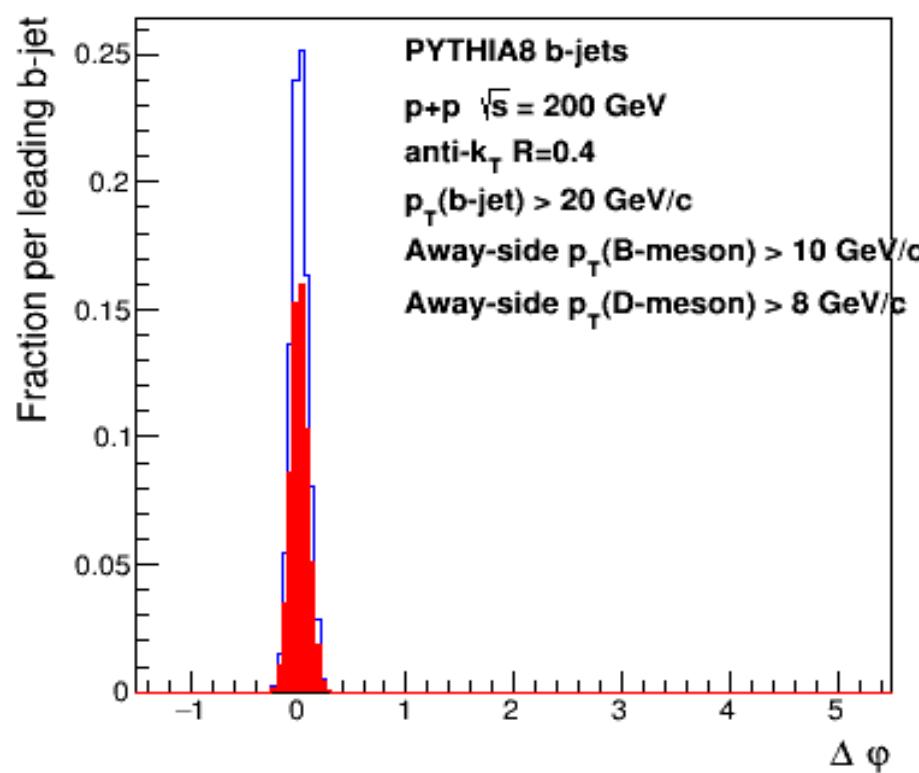


Check the correlations between B-meson and D-meson in the away-side of b-jets

- Will check the distributions in full simulation in p+p and Au+Au.



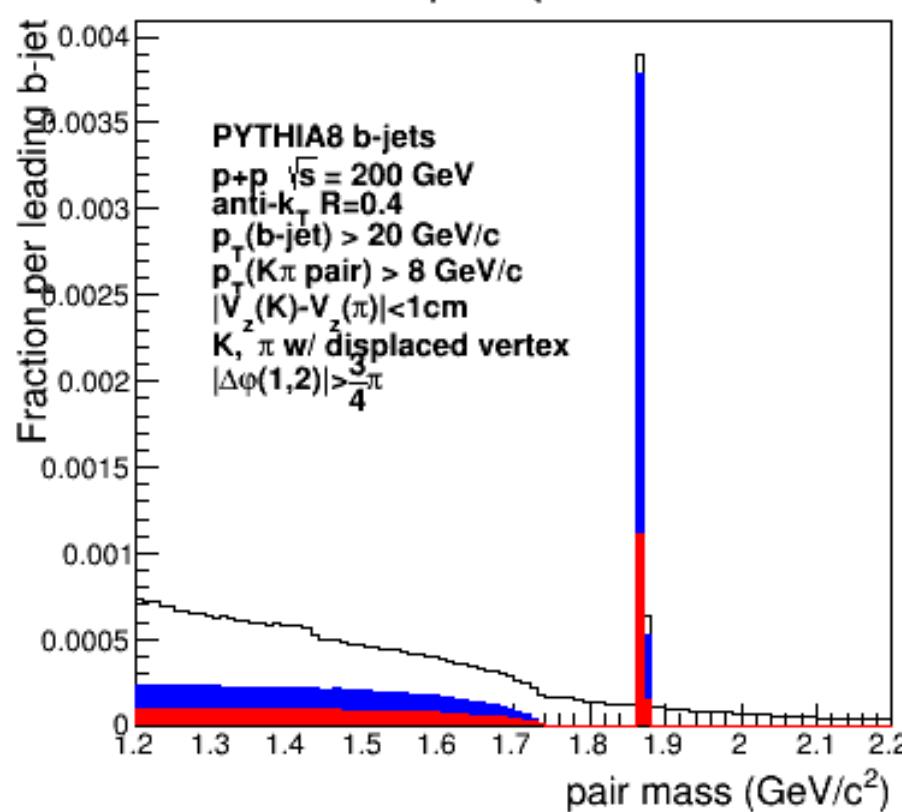
Correlation between D and B



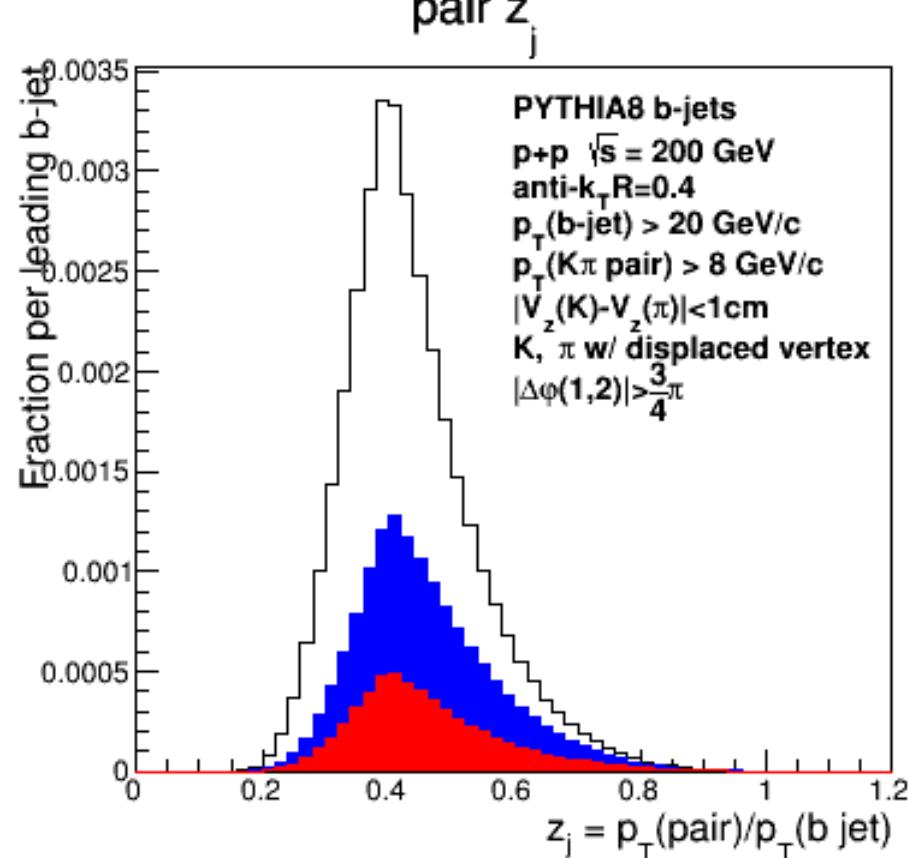
$K\pi$ pair mass and z_j

- All combinations (black), from D-meson (blue), from B decayed D-meson (red).
- In di-jet event, finding the away-side non-prompt $K\pi$ pairs will help the b-tagged jet finding.

Kaon and pion pair mass



pair z_j



To Do

- Tune the algorithm to better select B decayed D-mesons. Would like to combine the efforts from LBNL non-prompt D searching (see next talk).
- Use the tracking and DCA information in GEANT to help separate B decayed D-mesons and prompt D-mesons in full simulation.